DOCUMENT RESUME

ED 298 855 HE 021 846

AUTHOR Mencke, Reed; And Others
TITLE Assessing Institutional Effects on Retention. AIR 1988 Annual Forum Paper.
PUB DATE May 88
NOTE 24p.; Paper presented at the Annual Forum of the Association for Institutional Research (28th, Phoenix, AZ, May 15-18, 1988).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *College Environment; *Educational Environment; Higher Education; Institutional Research; *School Holding Power; Sex Differences; *Social Environment; *Student Attitudes; *Student College Relationship; Student Development; Student Participation; Teacher Student Relationship
IDENTIFIERS *AIR Forum; Tinto Theory

ABSTRACT

A pilot study of retention at a large, residential, Ph.D.-granting institution employed causal modeling (LISREL) to examine the effects of institutional variables (academic and social climate) on student retention within the causal structure specified by the Tinto model. Scales constructed from Cooperative Institutional Research Program (CIRP) and College Student Experiences Questionnaires (CSEQ) data were found to provide useful measures of the Tinto constructs. For males, institutional variables produced indirect effects on retention through student involvement and perceived gains in career and social development. Information on females is not reported, and it is noted that the results cited may apply only to white males with reasonably good grades in high school. Also, unlike the Tinto model, the data did not allow for distinctions between voluntary and involuntary withdrawal. Contains 33 references. (Author/KM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED298855

ASSESSING INSTITUTIONAL EFFECTS ON RETENTION

Presented at
The Twenty-Eighth Forum
of the Association for Institutional Research

Reed Mencke
Associate Director

Chintamani Sahoo
Programmer/Analyist

Rick Kroc
Director

Student Affairs Research Evaluation and Testing Office
University of Arizona
Tucson, Arizona 85721
(602) 621-1146

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

AIR

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

HE 021 846

for Management Research, Policy Analysis, and Planning

This paper was presented at the Twenty-Eighth Annual Forum of the Association for Institutional Research held at the Hyatt Regency Phoenix Hotel, Phoenix, Arizona, May 15-18, 1988. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum Papers.

Teresa Karolewski
Chair and Editor
Forum Publications Editorial
Advisory Committee

Abstract

This pilot study of retention at a large, residential, Ph.D granting institution in the Southwest employed causal modeling (LISREL) to examine the effects of institutional variables (academic and social climate) on student retention within the causal structure specified by the Tinto model. Scales constructed from Cooperative Institutional Research Program (CIRP) and College Student Experiences (CSEQ) data were found to provide useful measures of the Tinto constructs. For males institutional variables produced indirect effects on retention through student involvement and perceived gains in career and social development.

Today many institutions face financial constraints, public concerns about quality (NIE, 1984; Ewell, 1984) and, in some states, a 30 to 40 percent decline in the number of potential applicants (WICHE, 1984). The administrator deciding where to put scarce resource dollars needs information about the retention impact of institutional variables that are under his/her direct control. These include the institutional programs and services, e.g. academic advising, tutoring, and freshmen orientation, as well as malleable aspects of the campus social environment such as the availability of quality relationships with faculty, other students, and administrators.

While institutional variables are generally thought to influence retention (Beal & Noel, 1980), only a few studies of these variables (e.g. Bean 1982a, 1982b, 1985) have employed causal modeling techniques to control for the effects of student variables specified by existing theoretical models of retention (e.g. Spady, 1970; Tinto, 1975). Causal modeling techniques have provided useful clarification of the relationships between retention and such institutional variables as the effect of a freshmen orientation (Pascarella, Terenzini, and Wolfle; 1986) and financial aid offerings (Moline, 1987). Tinto (1987) argues that examining such relationships should be an integral aspect of the process of deciding where to commit scarce resources to improve the quality of programs and increase retention.

Modeling Institutional Effects On Retention

Theorists have analyzed the effect of college environmental factors on retention. Kamens (1971) reports empirical evidence in support of his argument that attrition can be explained on the basis of an organization's social charter and size. Kamens assumes that large and prestigious institutions exert greater holding power over students by means of their status-allocating roles.

Other theorists (e.g. Spady, 1970; Tinto, 1975; Rootman, 1977) see the importance of institutional variables in terms of the concept of person-environment fit. Tinto (1975) built on Spady's (1970) work to develop an explanatory, predictive model of the persistence/withdrawal process that has as its core the concepts of academic and social integration. The model is longitudinal and posits that persistence/withdrawal behavior is largely a function of the influence of four different constructs or variable sets: (a) background characteristics; b) initial commitments; c) academic and social integration; and d) subsequent goal and institutional commitments.

In the Tinto model institutional factors are addressed in terms of person-environment fit, as specified in his discussion of the academic and social integration concepts. While an interaction between student variables and institutional climate variables is implied in Tinto's discussion of academic integration, only a few studies have attempted to assess this interaction, e.g. Bean

1982a, 1982b, 1985. Thus the interaction of institutional factors and students variables would appear to warrant investigation by institutional researchers.

Student Development and Retention

Tinto (1975) specifies that academic integration can be measured in terms of both grade performance and intellectual development with grades representing an extrinsic motivation for continued attendance and intellectual development representing intrinsic motivation. Many researchers have ignored this formulation and operationalized the academic integration concept in terms of college grades; while others have added the effects together, often failing to provide empirical or theoretical justification for doing so. While some studies of the Tinto model have employed measures of intellectual outcomes other than retention, none have examined the separate pattern of effects implied in Tinto's discussion of grades and intellectual development. Studying the relationship of other educational outcomes to retention will lead institutions to view retention in the context of how well they are achieving their stated educational mission (Tinto, 1987).

CSEQ

Pace's (1983) College Student Experiences Questionnaire (CSEQ) has been widely utilized by institutions of higher learning because of its rich coverage of student development variables and relevance to outcome assessment. One recent study (Smart and McLaughlin, 1986) successfully employed a number of CSEQ Quality

of Effort scales to study the constructs of the Tinto model. Factor analyses of the CSEQ reported by Pace (1987) identified CSEQ factors which are promising measures of aspects of the person-environment interaction specified in Tinto's concept of academic integration. The results of such a measurement effort should prove useful to institutions which routinely collect representative data with this instrument.

Purpose

While the major variables underlying retention patterns at institutions of higher education have been identified by Tinto (1975), local formulation of the model may vary considerably depending on the structure of the institution in question. Consequently, a retention formulation cannot be considered valid for a particular institution unless it is based on representative data from that institution itself (Atkins, 1982; Pascarelli, 1986; Tinto, 1987). This study represents an attempt to construct such a model for our university. In addition we hoped to contribute to the general literature on retention by:

1) Studying retention in the broader context of outcomes assessment (Tinto, 1987);

2) Exploring the relationships specified by the Tinto model between extrinsic and intrinsic rewards, institutional climate and retention; and

3) Focusing on environmental and instructional variables under direct control of the institution and measuring these

variables with Pace's (1983) College Student Experiences Questionnaire (CSEQ), an instrument widely used to collect representative institutional data.

Causal Model

Institutional variables as well as measures of student development were incorporated into the basic Tinto model of retention. The model specified is presented in Figure 1.

Following Tinto (1975), retention is the dependent variable in a causal chain with background variables (family background and high school preparation) acting indirectly through system variables (environment, effort, and gains) to influence dropout/retention decisions.

Tinto describes grades as an extrinsic motivator for continued attendance while intellectual and social development act as intrinsic motivators. Both grades and intellectual development are considered measures of the underlying concept of academic integration. Given that first semester grades occurred prior to the time at which the measures of student involvement were collected, it seemed reasonable to assume a direct path from background variables to grades, which would in turn produce effects on academic and social effort.

System variables in the Tinto model represent interaction effects between the college environment and student development. This interaction is represented in the model by the exogenous effects of the academic and social environment variables on academic and social effort which in turn influences student development

variables (social gain, career gain, appreciation of arts and literature). Each student development variable represents the cumulative result of student background, college environment, and student involvement and is hypothesized to mediate the effects of these variables on fifth semester retention.

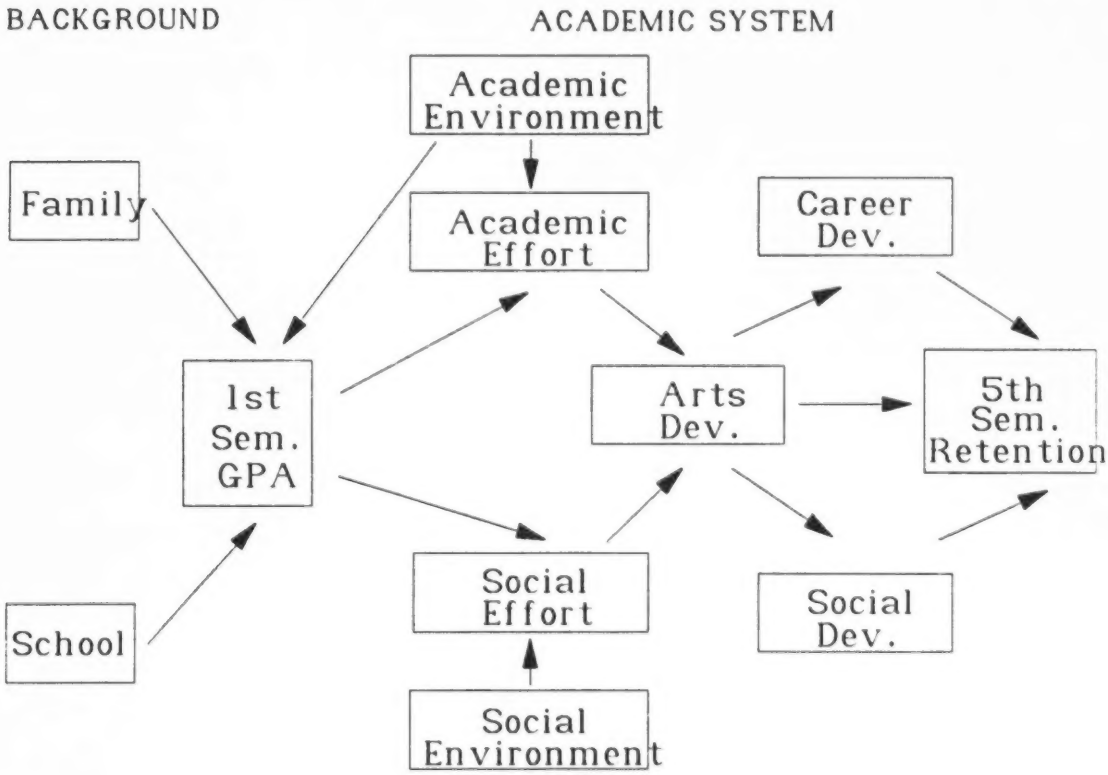

FIGURE 1. Causal Model (Based on Tinto, 1975)

Method

Data and sample

The Cooperative Institutional Research Program (CIRP) was administered to all new full-time freshmen entering fall semester, 1985. From this administration usable data were

obtained from 83 percent of the class. A random sample of 685 members of the class were selected for follow-up during spring semester, 1986. All members of this cohort were sent a survey packet containing the College Student Experiences Questionnaire (CSEQ) as well as a set of 30 locally developed items asking them to rate a variety of campus programs such as admissions, instruction, and academic advising. Usable surveys were returned by 348 students, a return rate of 51 percent. This data was matched with data from the CIRP as well as with university records data. Only those students for whom data were available on both instruments were included in our analysis.

Previous research (e.g. Astin 1975, 1982; Ramist, 1981; Tracy and Sedlecek 1984, 1985; Pascarella, 1985) demonstrates the importance of conducting separate analysis by ethnicity in studies of student retention. In the present investigation missing data for minority students on key variables resulted in sample sizes too small to conduct separate analysis by ethnicity. This led to the decision to exclude minority students from the analysis in hopes of clarifying the relationships between the variables which constituted the focus of this study.

The final sample included 185 non-minority students of whom 70 were male and 115 were female. Comparison of the final group selected for study with the population of non-minority freshmen entering in 1985 revealed a group well above average in regard to both high school grades and fifth semester retention.

Scale Construction and Factor Analysis

Variable sets representing constructs of the Tinto model were constructed based on previous factor analyses of the CSEQ scales by Pace (1987) and Smart and McLaughlin (1986). Separate principal componants factor analyses were conducted to confirm the factor structure of the scales for each endogenous variable set identified in the model.

The analysis of items designed to assess the constructs of academic and social environment confirmed that each set of items could be explained with a single factor and that item loadings were satisfactory. The results of these analyses are presented in Tables 1 and 2.

Table 1. Varimax Factor Loadings For Academic Environment Items

Item	Academic Environment
Satisfaction with instruction	.79
Teacher enthusiasm	.79
Clarity of course requirements	.48
Academic advising	.43

Table 2. Varimax factor Loadings For CSEQ Social Environment

Variable	Social Environment
Relationships with students	.80
Relationships with faculty	.76
Relationships with administration	.66

Analysis of the eight CSEQ Quality of Effort scales constructed to assess academic and social effort revealed that, in our sample, the variance of all scales related to these two

constructs was explained by a single factor. This factor, labeled student involvement, replaced the academic and social effort variables in the model and subsequent path analyses.

Table 3. Varimax Factor Loadings For Quality Of Effort Scales

Scale	Student Involvement
Information in conversations	.78
Personal experiences	.74
Experience in writing	.73
Topics of Conversation	.70
Course Learning	.70
Student Acquaintances	.70
Experiences with faculty	.69
Library Experiences	.55

Analysis of the CSEQ gain scores selected to represent student development aspects of the model revealed three factors: career gain, social gain, and gain in appreciation of the arts.

Table 4. Varimax factor loadings for CSEQ Gain Scores*

Gain Score	I Social Development	II Career Development	III Arts Appreciation
Self Understanding	.85		
Values & Ethics	.84		
People	.80		
Philosophy/Culture	.67		
Background in Field		.84	
Vocational Skills		.82	
Career Informantion		.77	
Broad Education		.42	.35
Literature			.87
Art/Music/Drama			.73
Writing Clearly			.54

*Factor loadings smaller than .30 were omitted from the table.

Background Variables

Family background. This component of the model was assessed by means of a 4 item scale which was the sum of family income (14 categories from "less than $6,000" to "$150,000 or more"), father's education (8 categories from "grammar school or less" to "graduate degree", Mother's Education (8 categories from "grammar school or less" to "graduate degree", and financial concern coded as (3=major concern, 2=some concern, and 1=none). Standardized alpha reliability = .71.

Pre-college schooling. This 3 item scale was the sum of high school grades, high school rank, and high school study in mathematics. Standardized alpha reliability = .67.

Institutional Variables (CSEQ)

Academic Environment. The student's perception of the quality of the academic environment was assessed by four items asking him/her to rate various aspects of instruction and advising on a 5 point scale. Standardized alpha reliability = .50.

Social Environment The student's perception of the social environment was obtained by three items asking them to rate on a seven point scale the degree to which they found faculty, other students, and administrators supportive and helpful. Standardized alpha reliability = .65.

Student Involvement (CSEQ)

Consistent with recent research by Smart and McLaughlin (1986), the present study operationally measured academic integration by means of CSEQ quality of effort scores on the library

experiences, experiences with faculty, course learning, and experience in writing scales. Social integration was measured by means of CSEQ quality of effort scores on student acquaintances, personal experiences, topics of conversation, and information in conversations scales. As noted earlier factor analysis of the above scales yielded a single factor, student involvement, which combined the scales measuring academic effort with those measuring social effort. This student involvement factor was substituted in the model and employed in subsequent analysis. Standardized alpha reliability = .85.

First Semester GPA

This variable was obtained from university records and was assumed to measure the extrinsic motivation for continued enrollment.

Student development (CSEQ)

Factor analysis of the CSEQ items assessing student development revealed three factors measuring the student's estimated gains in social development, career development, and appreciation of art and literature.

Social Development. Four CSEQ items loaded on the social development factor: gains in self understanding; gains in developing values and ethical standards; gains in understanding how to get along with different kinds of people; and gains in becoming aware of different philosophies, cultures, and ways of life. Standardized alpha reliability = .83.

Career Development. The items loading on the career development factor were: gains in acquiring background in a professional, scientific, or scholarly field; gains in acquiring skills applicable to a vocation; gaining information relevant to a career; and gains acquiring a broad education about different fields of knowledge. Standardized alpha reliability = .77.

Arts Appreciation. Three CSEQ items loaded on the arts appreciation factor: gains in acquaintance and enjoyment of literature; gains in developing an understanding and enjoyment of art, music and drama; and gains in writing clearly and effectively. Standardized alpha reliability = .64.

Fifth Semester Retention

This variable, coded 0=not attending, or 1=attending was the dependent variable for the study.

Results

Path Analysis Results For Males

For the initial analysis, path coefficients for structural equations based on the model in Figure 1 were estimated by the LISREL program (Joreskog and Sorbom, 1981). The chi-square test for goodness of fit was significant suggesting the need to revise the model. Paths were added or deleted based on theoretical considerations used in combination with the modification indices generated by the LISREL program. This estimation procedure produced a preferred model with acceptable goodness of fit (chi-square=30.98, d.f.=26, p=.229).

The revised model for males, shown in Figure 2, is reasonably consistent with Tinto's theoretical expectations and explains 10 percent of the variance in persistence/withdrawal decisions. This modest result is comparable to that reported by Munro, 1981; and Pascarella and Chapman, 1983).

As predicted, both institutional variables (academic and social environment) were causally related to student involvement. Involvement acted through social gain to produce a direct effect on fifth semester retention. One unanticipated result was the negative path from high school grades to fine arts appreciation and retention.

In the male sample, background variables were causally related to first semester GPA but the expected path from grades to involvement did not occur nor was the variance in involvement explained by background. It may be that the high path coefficient between high school grades and first semester college grades left little variance to be accounted for.

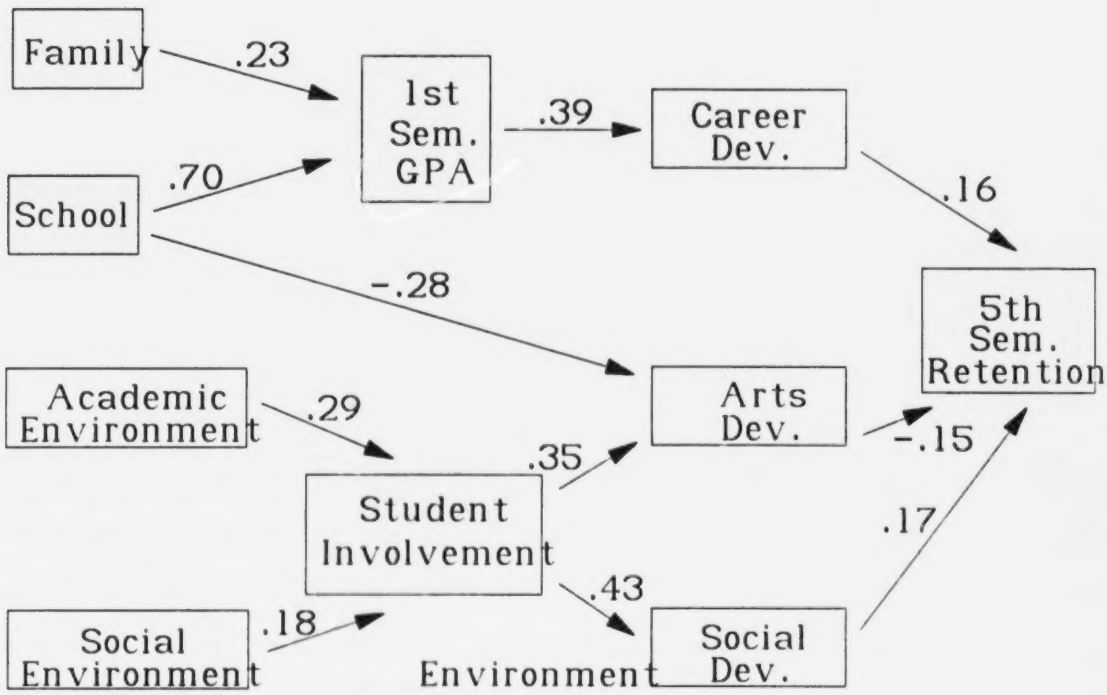

FIGURE 2. Revised Model For Males

Path Analysis Results For Females

The model fit the preffered model the female data was unsuccessful, explaining only 3% of the variance in retention. This suggests the need for further exploratory analyses of the variables associated with female withdrawal decisions.

Implications For Institutional Research

The CSEQ provides some useful scales for studying the Tinto Model. These scales are highly correlated, however, and the

factor structure may vary with the kind of sample one is working with. It is recommended that confirmatory factor analysis be employed in future studies of the CSEQ scales as it was here.

Institutional Variables

Some support for the hypothesized relationship between institutional variables and Tinto's academic and social integration variables (here the interaction of student involvement, grades, and student development) was provided by the path analysis. As in previous studies these effects were mediated through student involvement and student development.

The implications of this finding for those involved in program evaluation efforts are illustrated by a recent study by Pascarella et. al. (1986). Pascarella found that a freshmen orientation program had no direct effect on retention but still had a larger indirect effect (through social integration) than did any other variable tested. It is recommended that future program evaluation efforts consider the inclusion of variables such as Pascarella's social and academic integration scales or the student development measures employed here.

Measures Of Student Development

As Tinto (1987) has suggested, the inclusion of student development measures in retention studies may enrich our understanding of the outcomes of obtaining a college education. Our effort to construct such measures from CSEQ scales and to

assess their causal relationships with retention was successful, at least for males. Both career and social development produced the direct effects on retention predicted by the model.

The importance of career development to withdrawal decisions has been a consistent theme in the retention literature. In the revised model for males, career development mediated the effect of freshmen grades on retention. This finding is consistent with Astin's (1987) discussion of the importance of career achievement motives to college freshmen, particularly males. Males who receive high first semester grades may experience a sense of progress towards desired career goals and this in turn provides a motivation for continued enrollment.

It is likely that the negative path from the arts appreciation factor to retention reflects an underlying effect of college major which is itself correlated with both high school grades and gains in arts appreciation. We recommend that future work employing this scale include college major as a variable in the model.

Limitations

1) The most serious limitation of the present analysis resulted from our attempt to make use of existing CSEQ data rather than employing a pure longitudinal design. Missing data led to some difficulties in matching and subsequently to a small and somewhat restricted sample. It is important to keep in mind that the results may apply only to white males with reasonably good grades in high school.

2) The data available did not allow us to distinguish between voluntary and involuntary withdrawal, an important distinction in the Tinto model.

References

Asher, H.B. (1983). Causal modeling (2nd ed.). Beverly Hills: Sage Publications.

Astin, A.W. (1975). Preventing students from dropping out. San Francisco: Jossey-Bass.

Astin, A.W. (1982). Minorities in American Higher Education. San Francisco: Jossey-Bass.

Astin, A.W, Green,K., Korn,W. and Schalit, M. (1987). The American freshmen: national norms for fall 1987. Los Angeles: American Council on Education.

Beal, P., and Noel, L. (1980). What works in student retention: A preliminary summary of a national survey. Iowa City, Iowa: ACT and NCHEMS.

Bean, J.P. (1980). Dropouts and turnover: The synthesis and test of a causal model of student attrition. Research in Higher Education, 12, 155-187.

Bean, J.P. (1982a) Student attrition, intentions, and confidence: Interaction effects in a path model. Research in Higher Education, 18, 291-320.

Bean, J.P. (1982b) Interaction effects based on class level in an explanatory model of college student dropout syndrome. American Educational Research Journal, 22, 35-64.

Ewell, P.T. (1984). Conducting student retention studies. Boulder, CO: NCHEMS.

Ewell, P.T. (1987). Principles of longitudinal enrollment analysis: Conducting retention and student flow studies. In J.A. Muffo and G.W. McLaughlin (Eds.), A primer of institutional research. Tallahassee, Fl., AIR.

Joreskog, K. and Sorbom, D. (1981). LISREL V. and LISREL VI: Analysis of linear structural relationships by maximum liklihood and least squares methods. Chicago: National Educational Services, Inc.

Kamens, D. (1971) The college "charter" and college size: Effects on occupational choice and college attrition. Socio. Ed., 44, 270-296.

Moline, A. (1987). Financial aid and student persistence: An application of causal modeling. Research in Higher Education, 26, 130-147.

Munro, B. Dropouts from higher education: Path analysis of a national sample. American Educational Research Journal, 18, 133-134.

NIE Study Group on the Conditions of Excellence in American Higher Education. (1984). Involvement in learning: Realizing the potential of American higher education. Washington, DC: U.S. Government Printing Office.

Pace, R. (1983). College Student Experiences Questionaire. Higher Education Research Institute, UCLA, Los Angeles.

Pace, R. (1987). CSEQ: Test manual and norms. The Center for the Study of Evaluation, UCLA, Los Angeles.

Pallett, W.H. (1984). The use of ACT pre-enrollment measures to test Tinto's theory of attrition. Unpublished doctoral dissertation, Kansas State University, Manhattan.

Pascarella, E. (1985). Racial differences in factors associated with bachelor's degree completion: A nine-year follow-up. Research in Higher Education, 23, 351-373.

Pascarella, E. (1986). A program for research and policy development on student persistence at the institutional level. Journal of College Student Personnel, 27, 100-107.

Pascarella, E. and Chapman, D. (1983). A multi-institutional, path analytic validation of Tinto's model of college withdrawl. American Educational Research Journal, 20, 87-102.

Pascarella, E., Smart, J. and Ethington, C. (1986). Long term persistence of two-year college students. Research in Higher Education, 24, 73-96.

Pascarella, E., Terenzini, P. and Wolfle, L.E. (1986). Orientation to college and freshmen year persistence/withdrawl decisions. Journal of Higher Education, 57, 155-175.

Spady, W. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. Interchange, 1, 109-121.

Ramist, L. (1981). College Student Attrition and Retention. College Board Report No. 81-1. New York: College Entrance Examination Board.

Rootman, I. (1972. Voluntary withdrawl from a total adult socialization organization : A model. Sociol. Ed., 45, 258-270.

Tracey, T. and Sedlacek, W. (1984). Noncognitive variables in predicting academic success by race. Measurement and Evaluation in Guidance, 16: 171-178.

Tracey, T. and Sedlacek, W. (1985). The relationship of noncognitive variables to academic success: a longitudinal comparison by race . Journal of College Student Personnel, 16: 405-410.

Terenzini, P.T. (1987). Studying student attrition and retention. In J.A. Muffo and G.W. McLaughlin (Eds.), A primer of institutional research. Tallahassee, Fl.: AIR.

Terenzini, P.T. & Pascarella, E.T. (1977). Voluntary freshman attrition and patterns of social and academic integration in a university : A test of a conceptual model. Research in Higher Education, 6, 25-43.

Tinto, V. (1987). Leaving college. Chicago: The University of Chicago Press.

Tinto, V. (1982). Limits of theory and practice in student retention. Journal of Higher Education, 53, 687-700.

WICHE. (1984). High school graduates: Projections for the fifty states. Boulder CO: Western Interstate Commission for Higher Education.